

**WHAT IS CLAIMED IS:**

1. An Internet Protocol (IP) multicast control system, comprising:
  - 2 a first module capable of facilitating IP multicast control connections between a
  - 3 first apparatus and a second apparatus; and
  - 4 a second module capable of enabling termination of a control protocol of the first
  - 5 module and capable of being supported at an Asynchronous Transfer Mode
  - 6 (ATM) layer of the second apparatus.
1. The system of claim 1 wherein the first module is capable of being supported at the IP
- 2 layer of the first apparatus.
1. The system of claim 1 wherein the second apparatus is subtending with respect to the
- 2 first apparatus.
1. The system of claim 1 wherein:
  - 2 the first module is an IP Gateway Module; and
  - 3 the second module is a control protocol terminating module.
1. The system of claim 4 wherein:
  - 2 the first apparatus further includes:
    - 3 a Network Element Control Module;
    - 4 a Subtending Interface Module; and
    - 5 a Digital Subscriber Line (DSL) Interface Module; and
  - 6 the IP Gateway Module, the Network Element Control Module, the Subtending
  - 7 Interface Module and the DSL Interface Module are each interconnected.
1. The system of claim 1 wherein:
  - 2 the first apparatus further includes:
    - 3 a module capable of controlling a plurality of network elements of the first
    - 4 apparatus;

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5           a module capable of supporting communication with at least one subtending  
6           network node of the first apparatus; and  
7           a module capable of supporting communication with at least one Digital  
8           Subscriber Line (DSL) apparatus; and  
9           each one of said modules is interconnected with each other one of said modules.

- 1       7. The system of claim 6 wherein:  
2           the first apparatus includes a first Digital Subscriber Line Multiplexor (DSLAM);  
3           the first DSLAM includes an IP layer;  
4           the IP Gateway Module is capable of being supported at the IP layer of the first  
5           apparatus; and  
6           the IP Gateway Module is an network element of the first DSLAM.
- 1       8. The system of claim 7 wherein the second apparatus is subtending with respect to the  
2           first DSLAM.
- 1       9. The system of claim 8 wherein:  
2           the second apparatus includes a second DSLAM; and  
3           the Gateway Control Protocol Terminating Module is a network element of the  
4           second DSLAM.
- 1       10. The system of claim 1 wherein:  
2           the first apparatus includes an IP Gateway apparatus including an IP layer; and  
3           the IP Gateway Module is a network element of the IP Gateway apparatus.
- 1       11. The system of claim 10 wherein the IP Gateway Module is capable of being supported  
2           at the IP layer of the IP gateway apparatus.
- 1       12. The system of claim 10 wherein the IP gateway apparatus and the second apparatus  
2           are network nodes of a common network of network nodes.

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1       18. A communication apparatus, comprising:  
2           a first network node including an Internet Protocol (IP) Gateway Module; and  
3           a second network node including a Gateway Control Protocol Terminating  
4           Module;  
5           wherein the IP Gateway Module is capable of facilitating IP multicast control  
6           connections between the first network node and the second network node and  
7           wherein the Gateway Control Protocol Terminating Module is capable of  
8           enabling termination of a control protocol of the IP Gateway Module and is  
9           capable of being supported at an Asynchronous Transfer Mode (ATM) layer of  
10          the second network node.

1       19. The communication apparatus of claim 18 wherein the second network node is  
2           subtending with respect to the first network node.

1       20. The communication apparatus of claim 18 wherein:  
2           the first network node includes a Digital Subscriber Line Multiplexor (DSLAM);  
3           the DSLAM includes an IP layer; and  
4           the IP Gateway Module is an network element of the DSLAM.

1       21. The communication apparatus of claim 20 wherein the IP Gateway Module is capable  
2           of being supported at the IP layer of the DSLAM.

1       22. The communication apparatus of claim 20 wherein:  
2           the DSLAM further includes:  
3              a Network Element Control Module;  
4              a Subtending Interface Module; and  
5              a Digital Subscriber Line (DSL) Interface Module; and  
6           the Network Element Control Module, the Subtending Interface Module and the  
7            DSL Interface Module are each interconnected.

1       23. The communication apparatus of claim 20 wherein:  
2           the DSLAM further includes:  
3              a module capable of controlling a plurality of network elements of the  
4              DSLAM;  
5              a module capable of supporting communication with at least one subtending  
6              network node of the DSLAM; and  
7              a module capable of supporting communication with at least one Digital  
8              Subscriber Line (DSL) apparatus; and  
9              each one of said modules is interconnected with each other one of said modules.

1       24. The communication apparatus of claim 20 wherein the second apparatus is subtending  
2           with respect to the first DSLAM.

1       25. The communication apparatus of claim 24 wherein:  
2           the first network node includes a second DSLAM; and  
3           the Gateway Control Protocol Terminating Module is a network element of the  
4           second DSLAM.

1       26. The communication apparatus of claim 18 wherein:  
2           the first network node includes an IP Gateway apparatus including an IP layer; and  
3           the IP Gateway Module is a network element of the IP Gateway apparatus.

1       27. The communication apparatus of claim 26 wherein the IP Gateway Module is capable  
2           of being supported at the IP layer of the IP Gateway apparatus.

1       28. The communication apparatus of claim 26 wherein the IP gateway apparatus and the  
2           second apparatus are network nodes of a common network of network nodes.

1       29. The communication apparatus of claim 28 wherein the common network operates in  
2           accordance with ATM.

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- 1       30. The communication apparatus of claim 26 wherein the first network node and the  
2           second network node are network nodes of a first network of network nodes and a  
3           second network of network nodes, respectively.
- 1       31. The communication apparatus of claim 30 wherein:  
2           the first network node operates in accordance with IP; and  
3           the second network node operates in accordance with ATM.
- 1       32. The communication apparatus of claim 26 wherein:  
2           the second network node is a hub network node; and  
3           a third network node is a subtending network node with respect to the hub network  
4           node.

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1       33. A method for facilitating Internet Protocol (IP) multicast services within a deployed  
2       network of network elements, comprising:

3              implementing, at an IP layer of the first network node, functionality capable of  
4              controlling multicast connections between the first network node and a second  
5              network node an IP Gateway control protocol; and  
6              implementing, at an Asynchronous Transfer Mode (ATM) layer of the second  
7              network node, functionality capable of terminating the IP Gateway control  
8              protocol.

1       34. The method of claim 33 wherein:

2              the first network node includes a Digital Subscriber Line Multiplexor (DSLAM);  
3              the IP layer is integral with the DSLAM; and  
4              implementing said functionality capable of controlling multicast connections  
5              includes implementing said functionality at the IP layer of the DSLAM.

1       35. The method of claim 33 wherein implementing said functionality capable of  
2              controlling multicast connections includes coupling an IP Gateway Module with at  
3              least one of:

4              a Network Element Control Module,  
5              a Subtending Interface Module; and  
6              a Digital Subscriber Line (DSL) Interface Module.

1       36. The method of claim 33 wherein implementing said functionality capable of  
2              controlling multicast connections includes coupling a module capable of controlling  
3              multicast connections with at least one of:

4              a module capable of controlling a plurality of network elements of a first network  
5              node;  
6              a module capable of supporting communication with at least one subtending  
7              network node of the first network node; and  
8              a module capable of supporting communication with at least one Digital  
9              Subscriber Line (DSL) apparatus.

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1       37. The method of claim 33 wherein:  
2           the first network node includes an IP Gateway apparatus;  
3           the IP layer is integral with the IP Gateway apparatus; and  
4           implementing said functionality capable of controlling multicast connections  
5           includes implementing said functionality at the IP layer of the IP Gateway  
6           apparatus.

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